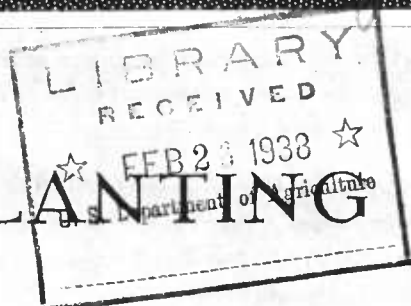


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AGRICULTURE

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Jan 1938



PLANTING

THE ROADSIDE



THE USERS of country roads are as much entitled to a good surface and attractive surroundings as are those who use a city street with similar traffic.

The appearance as well as the comfort of roads is enhanced by suitable tree planting on the right-of-way, and this can be better done by the community as a whole than by individuals acting independently.

A few States have good laws providing for such planting, others have indifferent ones, but most of the States have no laws except for State roads, and a few have none at all.

The adoption of a proper planting scheme for any road requires careful study by one familiar with the subject and the possibilities of the location. Usually an informal or natural arrangement is best.

Plantings must not hide approaching traffic, cause snowdrifts to form in the traffic lanes, interfere with safe footpaths, consist of unsuitable trees or shrubs, harbor noxious weeds, or interfere unduly with adjoining farm land.

Most roads are too narrow to provide proper planting space at present or to meet the traffic needs of the future.

PLANTING THE ROADSIDE

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THE ADVENT OF THE AUTOMOBILE for the transportation of people as well as produce has greatly stimulated interest in the improvement and beautifying of rural highways as well as country residences. Interest in country highways in the United States has increased more rapidly during the last few years than ever before in a similar length of time (fig. 1). Even communities that in the past have been content with trails suitable only for horseback riding and half-loaded farm wagons (fig. 2) now feel the need of roads over which it is possible to take an automobile (fig. 3).

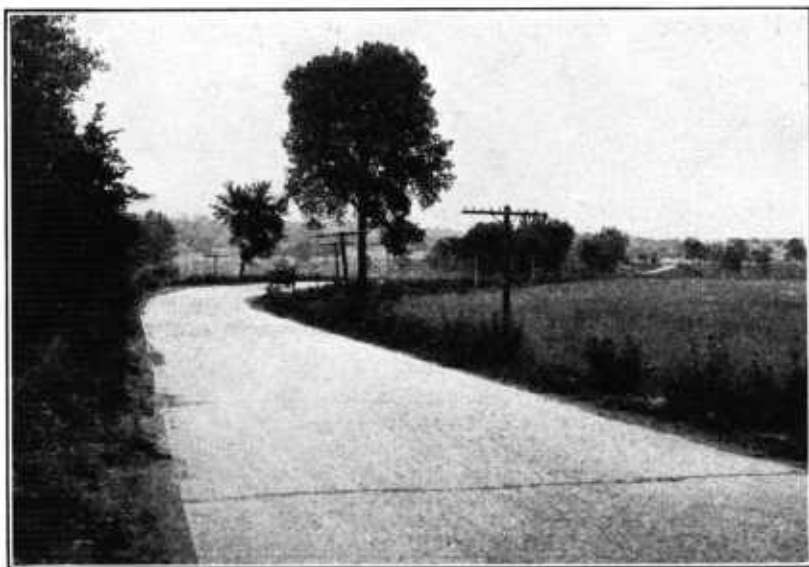


FIGURE 1.—A good road through a rural district bordered by enough trees to be attractive.



FIGURE 2.—A trail suitable only for half-loaded wagons. The natural vegetation would attract much traffic if the road surface were good.



FIGURE 3.—This road now made passable for automobiles winds through surroundings that make it attractive for pleasure driving.

A large proportion of this traffic consists of pleasure vehicles, and much of it is of such a character that it will seek the most beautiful routes if the road surface is good. Appropriate planting often adds the needed touch and always goes far toward making a road attractive. An acceptable road surface well shaded with good trees will often entice a traveler along a route that leads to worthwhile natural beauty beyond.

Many rural residents who are studying country-life problems are realizing that if young people are to be satisfied with farm life the

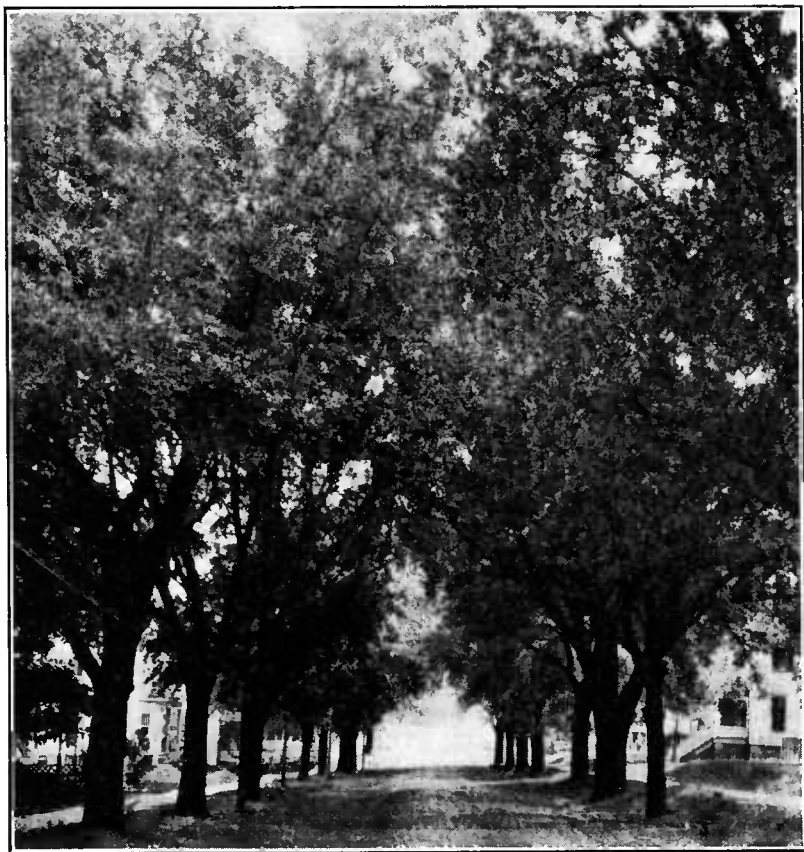


FIGURE 4.—An attractive town street.

surroundings must be attractive, and that one way to attain this objective is to plant good trees and shrubs along the country roads, at least comparable with those on the streets of modern towns and villages (fig. 4).

In addition, much interest has been aroused in the planting of highways as memorials for soldiers; also, as an expression of civic self-respect on the part of States and counties as well as communities.

Roadside plantings also furnish nesting sites, food, and protection

for desirable birds. The under plantings especially might be selected with the needs of our feathered friends in mind.¹

In view of this widespread and increasing interest it is well that communities, especially country districts and officials responsible for the roads, seriously consider the desirability of advancing some scheme of roadside improvement by making a study of the advantages and disadvantages of plantings. Such a study is worthy of effort even in communities where improvements are considered impracticable or undesirable. It should include the preparation of alternative plans, so that an intelligent decision as to the method to be employed may be made.

CONTROL OF PLANTING

In order that trees may be grown successfully they must be given reasonable care and protection. In addition, roadside tree planting, even more than tree planting on village and city streets, needs unity of idea and expression over considerable distances. As a rule, longer stretches of country road than of a city street are visible at one time, and the rate of travel is faster, so that different sections of the road will be passed so rapidly that it will appear as a jumble if the same material is not used over long distances. For example, assume that a number of farmers along a mile of straight road tried to duplicate what they had seen in towns they had visited. One owned land on both sides of the road and planted Norway maples along his frontage; another, owning land only on one side, planted sugar maples, while his neighbor across the way planted sycamores; the fourth man failed to plant at all, and the fifth, sixth, and seventh each expressed his personal preference in his tree planting. The traveler would thus get seven distinct impressions in 2 or 3 minutes, which if continued for several hours would become monotonous, especially if the plantings were carefully lined and spaced at regular intervals (fig. 5). On the other hand, if this distance had been planted with one kind of tree at regular intervals (fig. 6) or if the trees had been mixed promiscuously and planted at irregular distances, some singly and some in clumps, especially if the distance from the side of the road varied somewhat, the effect would have been harmonious and pleasing because of the informality (fig. 7). In order to get these results there must be unity of action, which is most difficult to obtain unless there is some strong compelling force, as when a community sees its leading industry threatened with destruction without cooperative production or marketing. In esthetic undertakings it is usually more difficult to secure such cooperation than in enterprises in which the dollar is the impelling force.

Because of the difficulty of getting each property holder to consent to and to act on a given plan, and because the traveling public has as much interest in the appearance of the road as a whole as the adjoining property owner, it is desirable that the planting and subsequent care of roadside trees and shrubs be in the hands of a public body representing some logical political division, such as the State, county, town, township, or parish, rather than smaller units. The advantage

¹ Further suggestions along this line may be found in other Farmers' Bulletins of the United States Department of Agriculture, such as Nos. 1644, Local Bird Refuges; 1456, Homes for Birds; 760, How to Attract Birds in Northwestern United States; 844, How to Attract Birds in the Middle Atlantic States; and 912, How to Attract Birds in the East Central States.

of supervision of the roads themselves has come to be well-recognized, for most of the States have found it advisable to assume control over through routes to prevent indifferent townships or counties leaving unimproved links in an important connection between cities.

Because of the intimate relationship between road construction and maintenance and the upkeep of the roadside, the closest cooperation between the highway department and those having the plants in charge is needed. After the grade and line of street and sidewalk are once fixed in towns and cities, there is no reason or excuse for the street-surfacing work to interfere with the tree-planting space. On the country road, however, work is continually needed, such as the repairing of berm banks with material gathered from another point on the right-of-way, the cleaning of gutters and the corresponding dis-



FIGURE 5.—Formal plantings of trees in short stretches, giving an effect of patchiness instead of unity.

posal of the surplus material, and innumerable other necessary items of maintenance that might become serious sources of friction between two uncoordinated bodies. In construction, also, much may often be done to save or improve beauty spots along the road if the common interests carefully cooperate, as when a noble monarch of the forest or fields (fig. 8) should be saved to add beauty to the highway. Dividing the road is seldom practicable because of traffic hazards that may be introduced (fig. 8), but serious consideration should be given to shifting the road location slightly or including the tree in a central parking between roadways carrying the traffic in each direction. In some States this is accomplished by making the State or county highway department jointly responsible with the State or county agricultural board or forestry department for the care of the roadside.

Whatever the basis of cooperation, it is important that the policies be as nearly continuous as possible, for it takes a long time to grow trees, and frequent changes in plans are likely to be reflected in the plantings. Perhaps the most satisfactory way of securing competent supervision is to have an unpaid commission, the members of which are appointed for rather long terms, as it usually takes 2 or 3 years for a new commissioner to become sufficiently familiar with the work to be able to formulate desirable policies. With a



FIGURE 6.—A long stretch of formal plantings gives a pleasing effect.

small commission of three or five members, one of whom is appointed every 2 years, a majority of experienced members is on the board at all times; a less satisfactory arrangement is having a commission of five members, one of whom is appointed each year. This commission should employ an executive officer and such advisers as would enable it most wisely to develop plans and execute the work.

The method of appointing the commissioners is not so important as that each shall be selected from the territory as a whole rather than from a part of it. In some communities where the term of service is 10 years, each one's successor is appointed by the remaining com-

missioners, subject to confirmation by the court. In nearly all cases where this is done a member is not permitted to succeed himself. In other places similar commissions are appointed by the court or elected by the people. The important point is to keep the administration as nearly as possible on a purely business basis and in such form that the most cordial cooperation with the highway construction and maintenance departments is assured. There is a daily loss of desirable roadside vegetation through lack of such cooperative efforts and occasionally needless and at times apparently intentional destruction of new plantings because of interdepartmental jealousies.



FIGURE 7.—A road made beautiful by trees arranged informally.

The States differ greatly in the laws that govern highway planting. In many there are no laws on the subject; in some the laws permit planting to be done through personal initiative under State or county control, whereas in others it is done entirely through State initiative.

Without a strong public sentiment and adequate protective laws, there is little encouragement for public-spirited citizens to plant along the public roads because of the great likelihood of injury or careless, negligent, or even wanton destruction, public utilities in the form of wire-line companies often being very careless unless rigidly supervised.

Planting on State roads is being stimulated through the interest of the Bureau of Public Roads of the United States Department of Agriculture, which has direction of the expenditure of the funds used in Federal-aid road building. This interest has resulted in most of the States having a landscape engineer connected with the State road department who has real authority to determine the location and design of new State roads as well as to maintain existing State roads.

The maps illustrating the summary of the laws relating to roadside



FIGURE 8.—A forest monarch saved by dividing the road, but such a simple method often introduces unwarranted traffic hazards. To save such a tree the shifting of the road location slightly should be considered or the construction of two roads, one for the traffic in each direction.

planting in the various States indicate that authority for planting along State roads (fig. 9) is much more nearly adequate than is authority for planting along local roads (fig. 10), although there is room for improvement in most States in the regulation and the practice of planting on both types of road. It will be noted that more than one-fourth of the States have no laws relating to plantings along State highways and that almost half of them have no laws pertaining to plantings along the other roads of their respective States. Although there has been an increase of interest in roadside planting during the past 10 years, and an almost equal improvement in the laws authorizing and governing such plantings, there is still room for much improvement.

In several of the States all roadside trees in rural communities are under the jurisdiction of tree wardens, who issue permits for trimming and other necessary operations for the preservation of the trees and

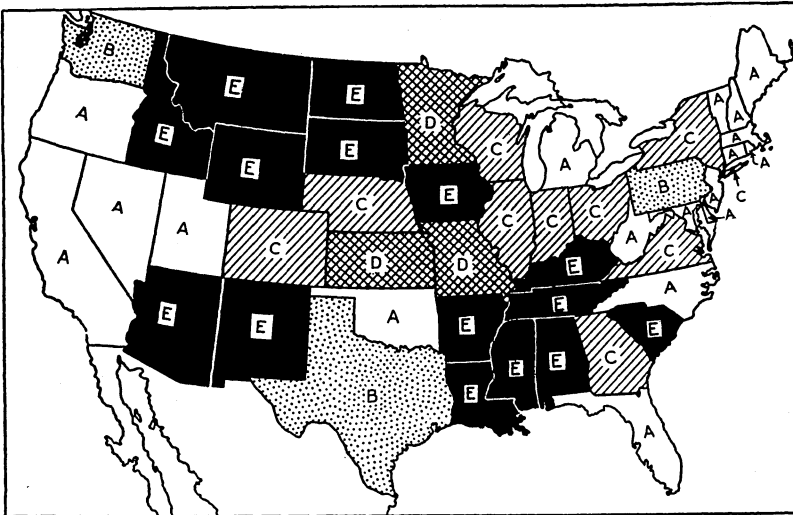


FIGURE 9.—Types of laws governing roadside planting on State roads: A, Specific legal authorization for State to at least partially plant and care for roadsides; B, planting done by the highway authorities under their general authorization of the road or because of specific mention of plantings in the appropriation; C, planting done by other than State agencies or with other than State funds; D, existing plantings controlled by highway authorities; no authorization for planting; E, no law.

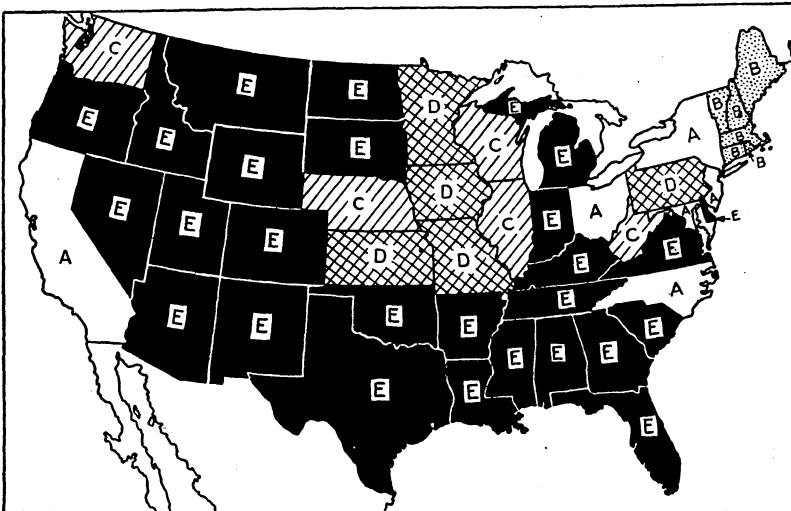


FIGURE 10.—Types of laws governing roadside planting in the different States: A, Planting done by local commissions; B, planting done by tree wardens; C, planting done by private agencies under permit; D, roadside growths may only be removed under permit from the road authorities; E, no law.

for their removal if, after a public hearing, there are no protests. Notice of such hearings must be posted in advance, including one on the tree under consideration, and if a protest is entered the final decision is passed on to a higher authority. In some States trees on private property may be marked as of public interest and value; they then become subject to the same jurisdiction as though actually in the road.

In connection with their State roads many of the States provide an authority to have jurisdiction of the roadside trees, with power to make new plantings and to direct their subsequent care by the State.

Every State should have at least as much authority for tree planting on country roads, aside from State roads, as is expressed in the laws of Nebraska, where property owners may plant trees along the public highway upon which their property fronts and, in addition, the electors at a town meeting may arrange to plant and protect trees along the roads in their townships.

More authority to initiate such work would certainly be desirable. Wisconsin and California seem to have started in the right direction, the former having included roadside planting under the jurisdiction of the State Planning Commission, and the latter under the County Planning Commission. When a community has reached the point where it wants to undertake the work, it needs the power to have a properly constituted body make the plans and execute them either at the expense of the taxpayers as a whole or under a system of assessments against the properties benefited. Such an arrangement should be the ultimate aim; in the meantime it should be possible for planters to have adequate protection for any trees or shrubs that they may plant and also for communities to plant and protect their roadsides in common.

Planting and subsequent care on the State roads in California are under the Department of Public Works; but owing to lack of funds planting is often left to individual initiative under a permit contingent on a guarantee for the first year's maintenance, after which the highway department assumes responsibility. When the application receives the approval of the district highway engineers, it is referred to the State Department of Forestry for inspection, recommendation as to suitability of conditions, kinds of trees desirable, and directions for handling. Upon payment of funds sufficient to cover the cost of the initial planting and the first year's care, the Department of Public Works may undertake to do the work, thus making it possible for interested local organizations to raise funds for plantings and feel a direct responsibility in the undertaking, yet permitting the planting to be done under the supervision of men specially trained for it.

Pennsylvania is working on its State roads in practically the same way, although the law is not specific in this respect.

In Michigan the law requires that the State Highway Department and the State Board of Agriculture shall work together.

In Maryland the trees on all roads are under the supervision of the State Forestry Department, and all trimming and planting are under permit, so that the work of wire-line companies is done by experts who realize that future work permits depend upon the care with which the work is performed.

SUMMARY OF LAWS

The following suggests the scope of the laws of the different States.

Alabama.—No law.

Arizona.—No law.

Arkansas.—Certain kinds of billboards are prohibited near the highway.

California.—The State Department of Public Works protects, permits, or plants on State roads. An application is made to this department, and, with the approval of the division engineer, the State forester recommends the kind of tree and method of planting, the applicant bearing the cost of planting and care the first year and either doing the work himself or reimbursing the State for it, after which the State may assume the responsibility. Supervisors may appoint a county board of forestry of five members, one from each supervisorial district, to serve without pay; their duties are to define policies, make rules, and employ foresters, and to supervise rather than initiate planting and care on the roads not under the State highway system. In counties where there are county planning commissions they assume the duties of a board of foresters.

Colorado.—No law, except that no encroachments or operations are permitted on the right-of-way of State highways without permit from the State Highway Department. The highway department is promoting planting projects in accordance with Federal-aid policies.

Delaware.—The State Highway Department is authorized to set out and preserve trees where desirable along right-of-ways of State roads and is authorized to acquire timberland adjacent to the highway not more than 500 feet wide and to supervise and control such land.

Florida.—No law, but the highway department is endeavoring to secure a right-of-way 200 feet wide so that it may eventually be attractively planted.

Georgia.—No law, but the State Highway Department assumes jurisdiction and is doing some planting on State roads with Federal funds provided for the purpose.

Idaho.—No law.

Illinois.—The electors at the town meeting may offer premiums to induce planting along highways and to protect and preserve the trees, and planting may be done along State highways by any association, society, person, or persons if a permit is obtained from the department of public works and buildings, and the consent in writing of the adjacent property owners.

Indiana.—No law governing roadside improvement of other than State roads. The State Highway Commission is authorized to spend maintenance funds on roadside development, but none have been so used except some Federal funds.

Iowa.—No law for planting. Hedges or shrubbery must be cut to within 5 feet of the ground every 2 years, unless needed for windbreaks, which shall not be more than 40 rods long. Supervisors may remove excess growths at the expense of property holders, except evergreens, oaks, walnuts, maples, or other hardwood trees that they deem it advisable to permit to stand, or any part of a forest extending more than 5 rods from the road line, or any single tree or groups of trees not exceeding 10 in number.

Kansas.—No law, except for the trimming of hedges on private property adjoining the highways.

Kentucky.—The State Planning Commission is authorized to make a State road plan. The county road engineer may authorize abutting property owners, at their own expense, to plant shade, fruit, or nut trees, suitable for shade, along the public highways, at least 15 feet from the center line and 60 feet apart, according to regulations of the State highway commissioner. The county road engineer has full care of such shade trees except in incorporated cities, towns, and villages.

Louisiana.—No law, except that no sign or notice may be placed on private land in any manner without the written consent of the owner, and no sign may be placed on property under the control of the State Highway Commission without the written consent of the commission.

Maine.—Tree wardens care for, plant, and mark trees that should be under public control.

Maryland.—Roadside trees are supervised by the State Department of Forestry, which issues permits to cut or trim, the work to be done under the supervision of a tree warden. On unimproved roads the abutting landowner has the right to cut trees on the roadside for his own use. A roadside tree is defined as one 3 or more inches in diameter measured 3 feet from the ground, growing in the right-of-way of a public highway or between the curb lines and property lines of

any street in an incorporated town in the State. It is further provided that trees planted by forest wardens automatically become roadside trees though less than 3 inches in diameter. No advertising signs are permitted within the right-of-way of public highways except direction signs, which, by permit, may carry advertising.

Massachusetts.—Responsibility for the planting, care, and cutting of trees, shrubs, and other growths rests with the department of public works for State roads and with an elected tree warden for other places except a city, which may designate a park commission, city forester, or street superintendent to act. Trees more than 1½ inches in diameter shall not be cut even by a tree warden without at least a week's notice of a hearing except for the safety of the road, but they may be cut by the department of public works on State highways.

Michigan.—The State Highway Commission and the State Board of Agriculture have joint supervision of planting trees on trunk-line and other highways with the consent of property owners; under another act the State Highway Commission may protect growth on State-aid roads and plant any trees they can secure without buying. A tax rebate of 5 cents a tree for 5 years is given for private planting on roads where there has been no State reward. Trees for planting may be obtained from the public-domain commission or the State Agricultural College. No signs are permitted on trees. There are no laws for State roads.

Minnesota.—This State has no law for planting, but has a law permitting the cutting, after notice and opportunity for the owner to be heard, of roadside willows, whether injurious or not, or of other trees or hedges if they interfere with road maintenance or cause snowdrifts. The responsibility for the execution of this law lies with the supervisors for town and county roads, county boards for State-aid roads, and the commissioner of highways for trunk lines. Recent highway-easement contracts specify for highway purposes that the owner in addition to giving unrestricted right to improve and beautify the right-of-way also further agrees not to cut, damage, destroy, or remove any tree, shrub, or any other natural growth on the land.

Mississippi.—No law.

Missouri.—The county highway engineer and the road overseers shall protect all fruit, shade, and ornamental trees along the sides of the public roads and shall remove all signs from trees. Cutting or destroying growths along the highway by unauthorized persons is a misdemeanor. The authorities of certain specially created districts may plant along the highways at public expense.

Montana.—No law.

Nebraska.—Owners may plant trees at a distance from the edge of the road not exceeding one-tenth of its width. The electors at the town meeting may take action to induce the planting and cultivation of trees along the highway and to preserve and protect those standing. The State controls the right-of-way of State roads, and planting along such roads is under the direction of the landscape engineer.

New Hampshire.—Mayors of cities, selectmen of towns, and county commissioners for unincorporated places, each August or September shall remove growths that may be injurious to the road or objectionable from an artistic standpoint, but shall preserve trees marked by tree wardens or owners of adjoining property as shade or fruit trees. Banks or hedges of bushes that protect the road or add beauty to the roadside shall also be preserved. With prescribed disks the tree warden shall mark trees for shade and ornament along the highways. If the consent of the adjoining owner is given or no objection is made within 30 days, the tree becomes the property of the town; or, if opposition is encountered, it may be purchased or condemned. The State Forestry Department is to raise trees for roadside planting, and the State Highway Department may plant State highways from maintenance funds, while tree wardens may plant on other roads from funds available to them. Tree wardens shall be appointed annually by the State forester from nominations made by the selectmen or other citizens of the town.

New Jersey.—It is permissible for cities, towns, boroughs, townships, and counties to control roadside plantings through shade-tree commissions, while the State Highway Commission controls planting on State highways.

New Mexico.—No law.

New York.—The town superintendent of highways may permit planting 8 feet from the edge of a 3-rod road and 1 foot farther for each additional rod of road. Elms shall not be planted closer than 70 feet, and other trees 50 feet apart, with a bonus of \$1 at the end of the year for three living trees with efficient guards. He may also plant and care for trees along the highways if the town board appropriates

sufficient money, or a tree warden may be appointed to perform these duties. The State superintendent of highways permits the planting and removal of trees on State roads, while the county superintendent has full control on county roads except within the limits of incorporated villages.

North Carolina.—The State Highway Commission regulates and may cooperate with county, township, district road authorities and with civic bodies and individuals in the selection, planting, and protection of roadside trees, shrubs, and vines. No tree or shrub shall be planted, trimmed, or removed without a written permit in accordance with the regulations of the highway commission. No advertising signs are permitted in the right-of-way and when placed outside the right-of-way, permission of the property owner must first be obtained, and each sign must carry a tax-permit tag.

North Dakota.—No law.

Ohio.—The State highway commissioner may, by a permit in writing, authorize owners to plant on intercounty and main market roads at their own expense, the county surveyor on county roads, and the township trustees on township roads. With the consent of the abutting landowner, the county surveyor shall have control of all trees and shrubs on the county roads of his county and the township trustees of the township roads, and as part of plans for an improvement they may provide for the planting of trees or shrubs along such improvement. The Ohio State agricultural or other department may plant along highways with the consent of the proper authorities and may use funds available for the development of forestry for such purpose.

Oklahoma.—No law except for State highways, where the commissioner is to make such rules and regulations as he may deem necessary for the planting of trees and shrubbery and for parking.

Oregon.—The State Highway Commission has control of plants and planting on right-of-ways of State roads except for the needs of wire lines, and has power to acquire right-of-ways extending to 300 feet from the center line of the road for scenic or recreational purposes and also grounds adjacent to or accessible from State highways for these purposes, including parking areas, auto camps, camping sites, recreational areas, and parks. There is no law for roads other than State roads, except that county roads over 50 feet wide on United States reclamation projects may be planted by adjoining property owners by permission of the county court.

Pennsylvania.—Townships with a population of 300 per square mile (practically suburban sections) may establish a shade-tree commission with power to plant and assess the abutting properties. In other townships no trees or shrubs may be removed along roads that run through cultivated lands, or in unimproved lands, or trees over 4 inches in diameter 2 feet above the ground and more than 15 feet from the middle of the road without the consent of the property owner, unless they are impeding traffic.

Rhode Island.—Plantings on all roads of the State highway system are under the State Board of Public Roads. The tree warden has the care and control of all trees and shrubs on other roads, including authority to remove or plant. Advertising devices are prohibited on highway right-of-ways and also on adjoining land unless the written consent of the owner is obtained.

South Carolina.—No law.

South Dakota.—No law.

Tennessee.—No law.

Texas.—The State Highway Department is authorized by appropriations to supervise beautification of the State highways, but there is no law for other roads.

Utah.—The State Highway Commission has jurisdiction over and is given authority to plant, water, prune, cut, remove, or otherwise care for trees, shrubs, and other vegetation within the limits of State highways and to enter into agreements with adjoining property owners, municipalities, park and water commissioners, and other public officials or persons for the planting, care, or removal of trees, shrubs, and other vegetation within or outside the highway limits. No law for other roads.

Vermont.—Tree wardens are elected in towns and villages to select, mark, and protect desirable existing trees and roadside growths, to remove undesirable ones, and to regulate or plant additional trees or shrubbery groups.

Virginia.—On State highways planting is permitted with the approval of the landscape engineer by permit of the commissioner of highways. No law for other roads.

Washington.—The State Department of Highways may beautify its right-of-way under its authority to maintain the roads. Owners adjacent to any highway

may plant hedges, trees, shrubs, or crops under permit, provided they do not interfere with public use and that such planting has legal protection.

West Virginia.—The State Road Commission shall plant trees at least 60 feet apart. The county engineer may issue permits for the planting of trees along county-district roads at the expense of the planter.

Wisconsin.—Trees may be planted under advice of the county rural planning commission, native plants to be used largely. If species attaining a height of at least 40 feet are planted, the owner may have them accepted as public trees when they attain a height of 12 feet if set not over 40 feet apart and within 8 feet of the outer line of the highway. They will then be under public protection, though title to them remains in the planter. If thus accepted, a rebate of 3 cents per rod may be obtained on road taxes, or 6 cents per running rod if both sides of the road are planted.

Wyoming.—No law.

PLANNING FOR THE PLANTING

Where State highway departments or counties undertake the work of planning for planting roadsides, either under a State forester or otherwise, it is assumed that the best expert advice on landscape planting will be obtained. Where there is no legal authority for such work, it is necessary for local organizations to foster it if much is to be accomplished.

In order to get the best results, some one familiar with the problems involved in roadside tree and shrub planting should study the situation and make recommendations for the treatment of long stretches of road as a unit, and every effort possible should be made to get each owner along the way to do his part. Naturally there will be breaks where, for one cause or another, a landowner will not have enough public spirit to help out the scheme. If the plan is informal, this omission will not be likely to be obtrusively noticeable, and eventually the owner may be converted, or the place may change hands. It must be kept in mind that such planting is not for a year or a decade but for generations, and the delay of a few years in one part of the scheme is not so vital as necessarily to prevent its ultimate success. In formal plantings, however, a gap of this kind is more noticeable; but even there trees planted several years apart will not show much difference after 30 or 40 years. In undertaking such community enterprises it is important that these details be regarded from the standpoint of the life of a community rather than from that of an individual, for what might justly be viewed as comparative failure when considered for a period of 20 or 30 years may prove to be a success after 50 or 60 years.

Unity of treatment is particularly needed for the main highways, especially the through routes from one part of the country to another. Unity of treatment for townships and even for counties and States may be more desirable than for smaller distances on these primary routes. The road between towns and villages should have at least a unity of, if not an absolute uniformity of treatment, although a change in character of country or of elevation usually warrants a material change in that of the planting.

The first step is to make a careful study of the surrounding conditions in order to select the type of planting that will be most appropriate for the place. For straight roads in a flat country the best arrangement is one of formal character with trees planted in rows at regular distances (figs. 11, 15, 20, 25, and 28); for a rough or a rolling country informal plantings (figs. 12, 18, 24, 26, 32, and 33) in

which trees singly or in groups are planted at irregular distances are more appropriate.

A good example of informal planting is the arrangement of trees along a road that has been cut through a woodland (fig. 13). Here one tree will be near the road; just beyond will be two or three farther back, possibly near together; and the next one may be either farther back or nearer the road, and all will be irregular distances apart. In addition to trees and shrubs, herbaceous perennials may be used,



FIGURE 11.—Formal plantings with trees at regular distances apart.

and the native growth should be encouraged, giving beautiful and appropriate effects. That the plantings shall not hide the view of approaching traffic, shall be easily and cheaply maintained, and shall be of such character as not to harbor noxious weeds, insect pests, and discases, especially in highly cultivated regions, are most important considerations and should be given serious forethought.

Climatic conditions frequently have an important bearing on the proper planting scheme. In places subject to heavy snowfalls the

effect of plantings in modifying drift formation needs to be utilized as an aid to keeping the roads free from snow. Where wind would otherwise keep the road clear, low plantings to windward may cause snow to lie on it, while high plantings or those too close to the road may cause drifts to form on it. On the other hand, it is often practicable to prevent the formation of drifts on the road by making thick plantings a little distance back from it, thus breaking the force of the wind and causing drifts to form between the plantings and the road rather than on it. Railroads frequently use this method to prevent deep cuts from filling. Because snow will collect



FIGURE 12.—An informal arrangement of trees irregular distances apart.

on both sides of a windbreak it is sometimes necessary in wind-swept locations not to plant trees and shrubs too close to the leeward side of the road, as well as to be careful about their location on the windward side. Although low-headed trees—that is, those without trunks, with their branches resting on the ground—and shrubby thickets may help in these ways, trees trimmed to a trunk of reasonable height when planted on the right-of-way seldom cause drifts on the road, as the wind sweeps under the trees and carries the snow beyond them.

In a few communities, such as the northern portions of Wisconsin, Michigan, New York, Vermont, New Hampshire, and Maine, sleighs are used for winter travel. In these places appropriate plantings may be made to increase the uniformity of the snow cover and prolong the sleighing season.

It is not uncommon to hear of shade trees being condemned because a strip of shaded gravel or dirt road fails to dry out as early in the spring as an unshaded portion. While the shaded part is later in thawing and drying and is in better condition more days in the year

than the unshaded portion, yet the impulse is to remove the existing shade instead of planting the remainder of the road. In summer, shaded roads do not dry out so quickly after rains, the mud on dirt roads is a little longer in drying, yet they do not become so intolerably dusty in drought or muddy so soon after the rain begins; furthermore, there is less variation in temperature on well-shaded roads than on those exposed to the direct rays of the sun, which tends to increase the durability of the road. Gravel roads in shade do not "ravel" so badly as similar roads in full sunshine because the shade helps to hold moisture in the soil. The possible disadvantage of shade trees may be almost eliminated by proper arrangement and a suitable selection of varieties.

The width of the right-of-way has an important bearing upon the quantity and arrangement of plantings, and even upon the possibility of any plantings at all. A liberal right-of-way has greater possibilities than is presented on the 3- or 4-rod roads usual in many sections of the country and much more than on the 40-foot right-of-way of the West Virginia State roads. On such narrow roads planting is practically impossible without the opportunity to use some of the private property adjoining (figs. 14 and 15).

Although planting can be made if a 15-foot space is available on each side of the roadway in a level country, this is narrower than it should be, for no allowance is made for footpaths that must eventually be provided on much-traveled roads or for the future widening of the road to accommodate increased traffic. This does not mean that all roads should be as liberal in width (200 feet) as the Dupont Boulevard in Delaware (fig. 16) nor that the narrower roads should not have appropriate plantings; but many of the more important roads being developed as through-traffic highways should be made wider, to permit future ade-



FIGURE 13.—A road cut through a woodland, showing the irregular arrangement of trees in informal planting.

quate and appropriate plantings. Planners should keep in mind the fact that often it may be desirable to develop important highways into double roadways, one for the traffic in each direction, sometimes at different levels, as has been done with Commonwealth Avenue in the suburbs of Boston and with roads in other places (fig. 17). In a hilly country the grading for such a road may be cheaper and the

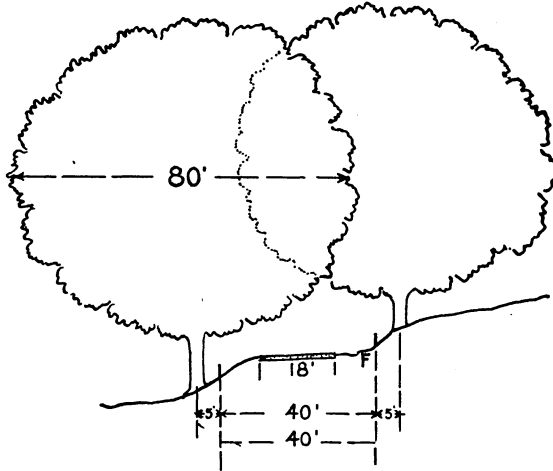


FIGURE 14.—A 40-foot right of way with an 18-foot improved section and a narrow footpath (F). Because of the limited room the shade trees must be planted at the edge of or outside the right-of-way.

result more attractive than a single wide road in the same place, but it makes the planting problem different, though fully as interesting.

SPACING THE TREES

In planting roadside and street trees the tendency is to place them too near one another, partly because narrow right-of-ways force the rows too close together when the trees are planted parallel to the center line, and partly through planting opposite one another varieties that become too large for the restricted space available.

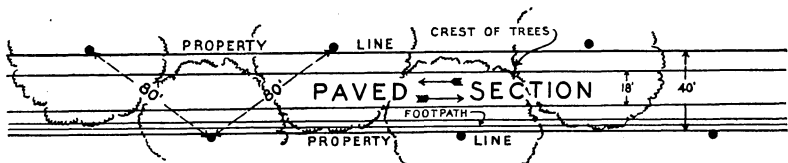


FIGURE 15.—A 40-foot right-of-way with an 18-foot improved road and a formal planting on the adjoining properties. In all formal plantings like this and those shown in figures 20, 25, and 28 one kind of tree should be used for long distances. Ordinarily these distances should be measured by miles or by the distance from village to village or from hilltop to hilltop.

The following suggestions give some of the more feasible arrangements of trees with relation to the road and the adjoining properties for right-of-ways of different widths.

Forty-foot right-of-way.—An 18-foot roadway on a 40-foot right-of-way (figs. 14 and 15) leaves no space for planting, as the 11 feet on each side is needed for slopes and for the upkeep of the necessary banks and gutters adjoining the improved portions. Thus, any tree



FIGURE 16.—Dupont Boulevard, a road having a right-of-way of 200 feet, much of which is still used by adjoining farmers for cropping. This width prevents building encroachments and makes possible suitable landscape development.



FIGURE 17.—A road on which traffic in opposite directions is carried at different levels with good plantings well started between them.

planting is forced onto the private property adjoining the right-of-way, and the distance between tree rows is of necessity largely determined by the wishes of the owners. If any tree planting is done on such a narrow roadway, because of cramped space it is almost certain to be formal.

Sixty-foot right-of-way.—With a 60-foot right-of-way and an 18-foot road there is space for informal planting with trees of several kinds (fig. 18), one predominating for a considerable distance. With such an arrangement trees may be placed nearer the road than in

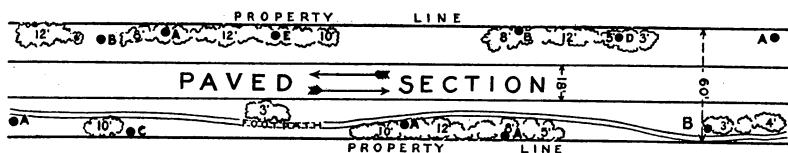


FIGURE 18.—A 60-foot right-of-way with an 18-foot improved road and informal plantings. The letters A, B, C, D, and E shown here and in figures 24, 26, 32, and 33 indicate different kinds of trees and suggest the relative proportions of different sorts that would be appropriate in informal planting. The numbers indicate the maximum height that shrubs should attain in the different locations.

formal planting, and any specimen found to be in the way of repair work may be removed with slight detriment to the effect of the whole. Here, too, some of the trees may be closer than in formal planting, for in some locations three or four will make a mass of foliage, giving the effect of a single tree, and if they should be too close, weak trees

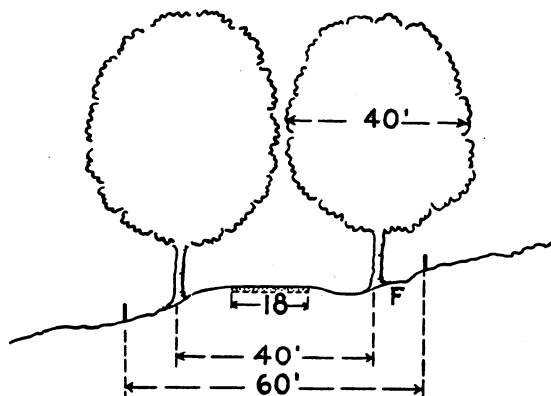


FIGURE 19.—A 60-foot right-of-way with an 18-foot improved roadbed. The trees are placed 20 feet from the center line of the road, which is the shortest distance practicable. The footpath (F) is outside the row of trees.

here and there may be removed as crowding begins, which is impossible with formal plantings. A 24-foot road allows so little space that the trees must be planted in a straight line, or nearly so, arranged in groups at irregular intervals instead of being spaced regularly. The

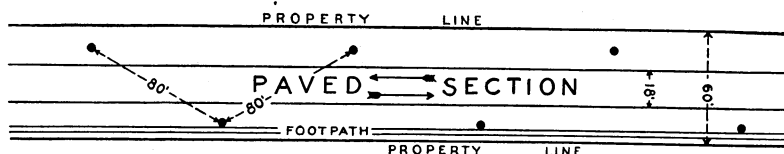


FIGURE 20.—A 60-foot right-of-way with an 18-foot improved road and rows of formally planted trees 40 feet apart. The trees that are nearest each other are 80 feet apart.

effect is not so pleasing as more irregular planting, but it is usually more satisfying than formal planting in open country.

A 60-foot right-of-way and an 18-foot roadway (fig. 19) allow for formal planting with the rows 40 feet apart and 10 feet inside the property line, which is a desirable distance. The varieties of trees should be restricted to those not likely to spread more than 40 feet

if they are to be planted directly opposite each other (as in fig. 28) on a 100-foot right-of-way. If, however, they are staggered (fig. 20), a tree of any spread may be used, provided the individual trees are separated by a distance greater than their probable spread. Those in the plan shown are less than 80 feet apart. With a 24-foot roadway

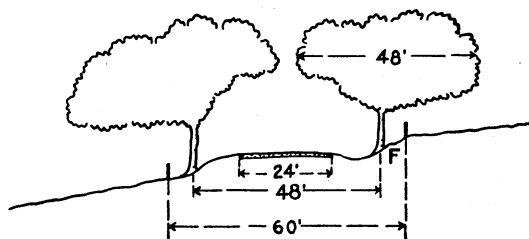


FIGURE 21.—A 60-foot right-of-way with a 24-foot improved roadbed. The trees are placed 24 feet from the center line of the road, which is probably the shortest distance practicable. The footpath (F) is outside the tree row.

it is necessary to set the trees within 6 or 7 feet of the property line (fig. 21), so as to have space for berm banks and gutters.

Eighty-foot right-of-way.—With an 80-foot right-of-way, it is usually possible to place the trees at least 10 feet from the property lines (fig. 22), although in a rough country and with a 24-foot paved section it may be necessary to put them farther from the center line (fig. 23) on account of the length of the slopes. With such a width

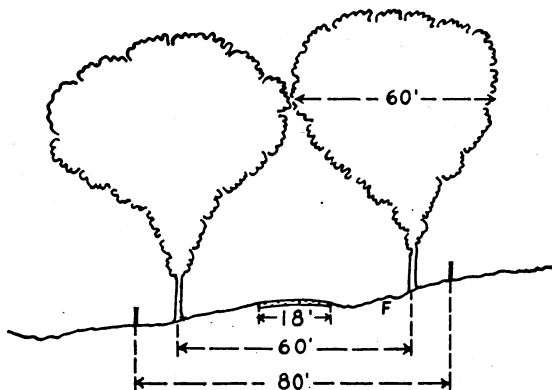


FIGURE 22.—An 80-foot right-of-way with an 18-foot improved roadbed and trees placed 30 feet from the center line, with a footpath (F) inside the row of trees. These trees could be placed 10 feet nearer the center of the road without interfering with it, but they look better if they are farther apart unless they are planted informally.

there is ample space for most effective informal planting (fig. 24), or trees of larger growth can be placed in formal plantings if preferred (fig. 25).

One-hundred-foot right-of-way.—On a right-of-way 100 feet wide it is possible even with a 24-foot roadway to have most attractive informal plantings (fig. 26) or formal plantings with large trees opposite each other (figs. 27, 28, and 29). Such a width would make it possible to accommodate interurban tracks in a central parking strip (figs. 28 and 29), but with such an arrangement of the space only formal planting would be possible.

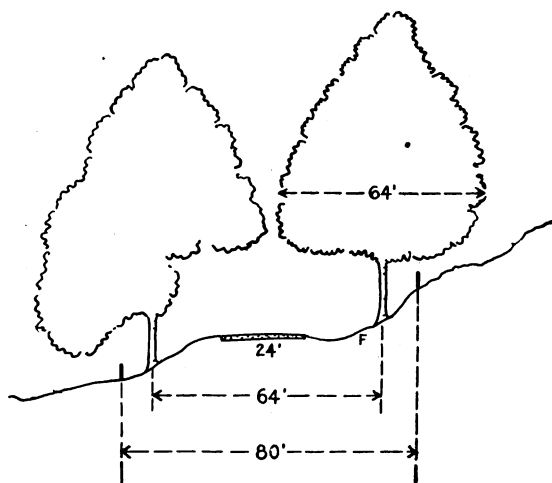


FIGURE 23.—An 80-foot right-of-way with a 24-foot improved roadbed. The trees are placed 32 feet from the center line and the footpath (F) is placed inside the row of trees.

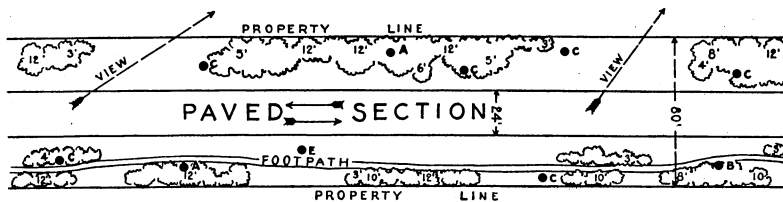


FIGURE 24.—An 80-foot right-of-way with a 24-foot improved road planted informally, leaving 28 feet of planting space on each side. The footpath winds along one side of the road. The shrubby clumps should be composed of plants from 3 to 12 feet high.

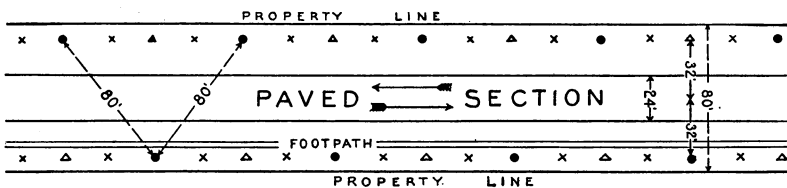


FIGURE 25.—An 80-foot right-of-way with a 24-foot roadway planted formally. The tree rows are 32 feet back from the center line of the road, and the trees are planted 80 feet apart across the road, or practically 100 feet apart in the rows. Tall shrubs are planted midway between the trees (Δ) and smaller shrubs between the tall shrubs and the trees (X).

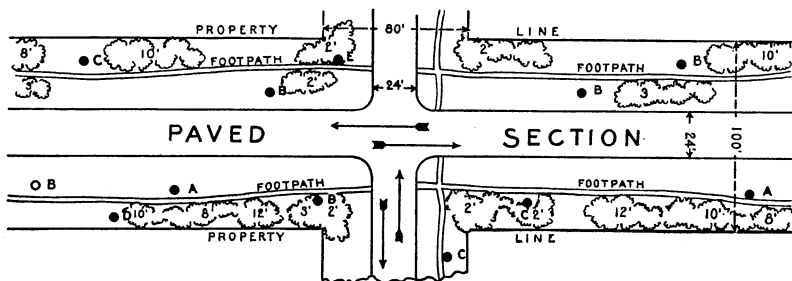


FIGURE 26.—A 100-foot right-of-way with a 24-foot improved roadbed, leaving 38 feet on each side in which informal plantings are placed. The footpaths wind in and out among the plantings. The figures in the groups indicate the appropriate height for the plants.

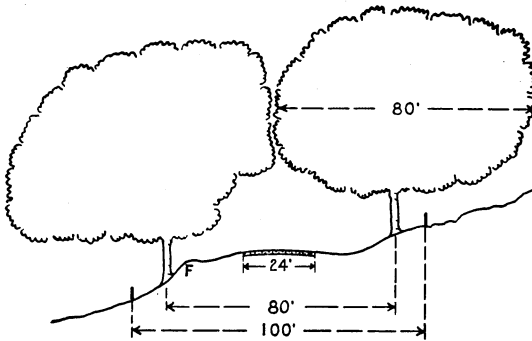


FIGURE 27.—A 100-foot right-of-way with a 24-foot improved roadbed and the trees placed 40 feet from the center line and the footpath (*F*) inside the row of trees. Having the trees this distance apart makes it possible to plant even the larger shade trees opposite each other, although at maturity the branches will interlace.

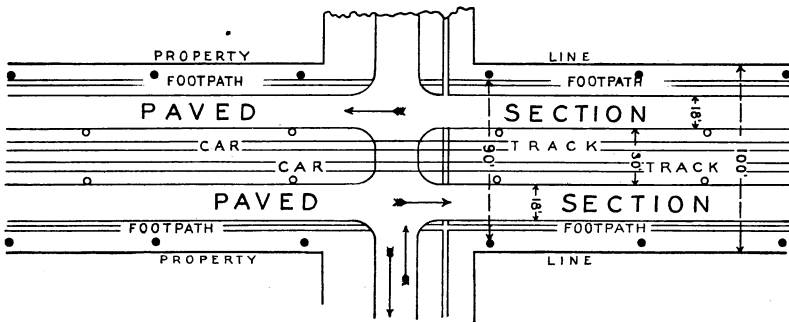


FIGURE 28.—A 100-foot right-of-way with a 30-foot central strip in which the trolley tracks are located, flanked by two 18-foot roadways. The tree rows are 90 feet apart, and the trees are 80 feet apart in the row.

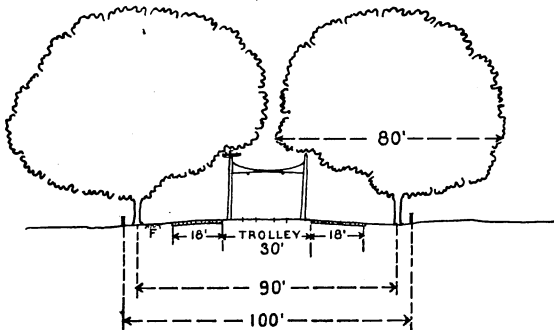


FIGURE 29.—A 100-foot right-of-way with two 18-foot roadways and a 30-foot strip in the center available for trolley tracks. The trees are 45 feet from the center line, and the footpath (*F*) is inside the row of trees.

Right-of-ways more than 100 feet wide.—With widths of right-of-way greater than 100 feet many arrangements are possible, varying the formal plantings from rows only 10 feet from each edge of the right-of-way (fig. 30) to a distance of 20 feet or more (fig. 31), arranging the trees in rows to correspond with their spread and the distance between the rows. These broader areas are especially well

adapted to informal planting (figs. 32 and 33), the additional space allowing much greater variety of arrangement.

In formal planting, the smaller so-called shade trees should not be closer than 50 to 60 feet and the larger ones no closer than 75 to 100 feet. With informal plantings much depends upon surroundings. If

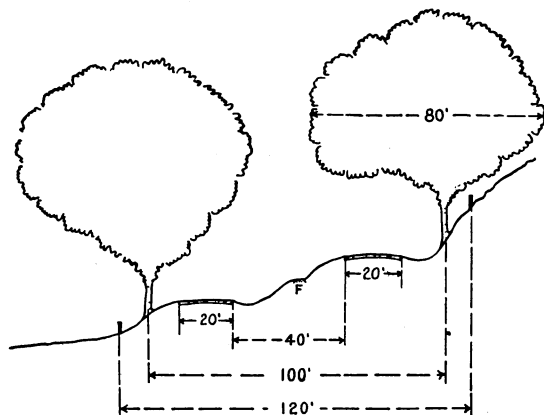


FIGURE 30.—A 120-foot right-of-way with two 20-foot roadways 40 feet apart at different levels and trees 100 feet apart. The footpath (*F*) is between the roads.

forming the edge of a thicket, they may be as close as 15 or 20 feet, depending on the location of trees on adjacent properties, the roadside planting supplementing private plantings. Unfortunately, there is always the possibility that private plantings may be radically changed,

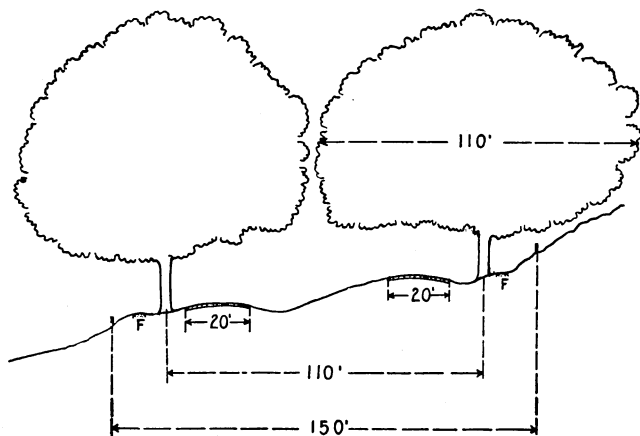


FIGURE 31.—A 150-foot right-of-way with two 20-foot roadways 50 feet apart and the trees 20 feet beyond the center line of the road. The footpaths (*F*, *F*) are outside the tree rows.

so that as far as practicable those on the roadside should be effective even if the others are altered.

The most desirable distance between trees on opposite sides of a road depends on local conditions. As has been shown, a wide strip dedicated to road use permits the rows to be spaced far apart, whereas a narrow one necessitates their being rather close together, an adequate distance between trees being obtained by planting irregularly

on both sides of the road (figs. 12, 13, and 15). In the few localities where it is desirable to catch and hold snow for sleighing, trees, especially evergreens, should be planted far enough apart to maintain an opening sufficiently wide not to intercept falling snow or to interfere too much with its reaching the ground beneath. Where there is a

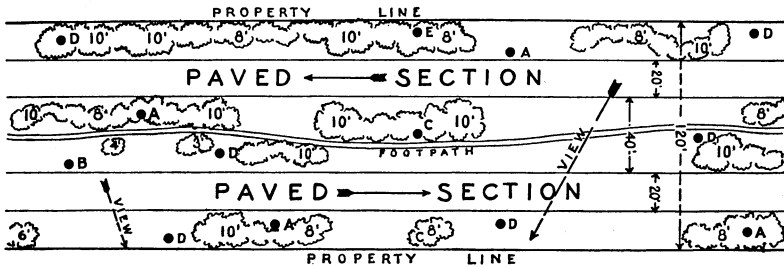


FIGURE 32.—A 120-foot right-of-way with two 20-foot paved roadways 40 feet apart. The footpath lies between the roadways, and the whole area is informally planted. Each letter indicates a different kind of tree, and the figures the height of shrubs that may appropriately be used.

tendency for the road to be very wet the trees should be kept from overhanging too much, which is accomplished either by planting them well back from the center line, by using trees of upright growth, or by leaving ample space between the trees in the rows. If they are arranged so that the limbs do not interlace overhead or trimmed to

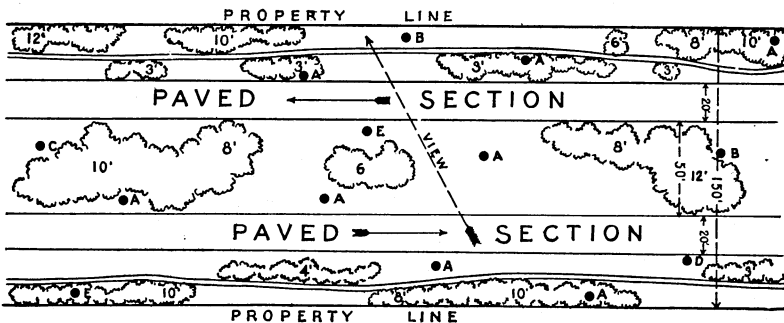


FIGURE 33.—A 150-foot right-of-way with a 50-foot central planting strip flanked by two 20-foot roadways, the whole informally planted. The letters indicate different kinds of trees, while the figures show the height of shrubs that might appropriately predominate in the different groupings.

high heads and underplantings omitted, there is a better chance for evaporated moisture to escape, thus giving opportunity for more rapid drying.

ARRANGEMENT OF SHRUBS AND PERENNIALS

Where trees are planted informally, irregular plantings of shrubs may be added most appropriately, and in many places shrubs without trees are even more effective. In addition to making the roadside more attractive, shrubs and woody vines help to prevent banks from washing. To be effective they should be in rather mixed clumps, arranged as to size, the smaller on the outside, with from half to three-fourths of each clump consisting of one kind of plant and some of the same plants in nearby clumps. Sometimes these groups should be sparsely scattered, again rather close together, and at times in con-

tinuous masses. Figures 18, 24, 26, 32, and 33 give an idea of arrangements possible for shrubbery groups.

Plantings near footpaths along every improved automobile road should be of such a height and so arranged that pedestrians are not hidden from the roadway. Seclusion is often appropriate in a public park, where the walks are used for pleasure, but not along a public thoroughfare, where necessity may require their use at night. For



FIGURE 34.—Blue gum, or eucalyptus, with palms and oleanders between.

this reason, plants not over 2 or 3 feet high should be used between the road and the footpath.

The open spaces between shrubbery groups may be covered with grasses or dwarf herbaceous growths with more or less possibility of showy flowers. Other herbaceous flowering plants can be added here or in the borders of the shrubbery groups. Wherever the ground has been made bare by the road work some care should be exercised to cover it with vegetation not likely to be injurious to the adjoining farming regions, otherwise it may become a breeding ground for troublesome plants.

Where the trees are set out formally, more care must be used in the selection and arrangement of supplementary plantings. Small trees can be placed between the larger ones but in line with them (fig. 25), such as flowering dogwoods between American elms in the eastern half of the United States; or specimen shrubs between, as highbush cranberry, red-stemmed dogwood, green-stemmed forsythia, or any other shrub of appropriate habit and height; while on another stretch of road a different shrub may be used. In the Southeastern States willow oak, crapemyrtle, and Cape-jasmine are effective. On 16 miles of road in California, blue gums have been interplanted with palms, oleanders and pampasgrass being in the smaller spaces (fig. 34).

The shrubs may be placed less formally, but the beds in which they are planted should be for the most part parallel with the tree rows or at least rather formally or symmetrically arranged. However, the size and character of the plants in these beds may be as irregular and unsymmetrical as though they were used in informal plantings, but if less formality is desired the trees as well as the underplanting may be informally arranged. In towns and cities where the tree planting is necessarily formal, the shrub plantings are sometimes as informally arranged as the space between the sidewalk and the curb permits.

Low plantings especially must be arranged with great care to avoid dangerous conditions. It is a principle of landscape design to use plantings in the concave turn of drives and walks to assist in giving an apparent reason for such turns, but the use of material in this way must be kept in check to the extent of not hiding approaching traffic from crossroads (figs. 26 and 28), from private drives, and especially from crossings for pedestrians. Nor need trees interfere with the view of traffic, as there are many varieties suited to every region that may be trimmed to a trunk of sufficient height to permit an unobstructed view beneath the limbs, except perhaps at the foot of hills.

To design harmonious plantings that provide a unity in contiguous sections of the road without falling into a monotonous treatment requires judgment and good taste. In a slightly rolling country an informal planting largely of one kind of tree with an admixture of several other kinds in the dip between two of the rises, the next dip of another variety with a similar admixture, and the high ground between planted with both kinds is very effective. If the road is straight and the trees are planted formally, the change in variety may be made at each village or at some other natural point of separation of sections of the road. Where a main highway turns abruptly at crossroads, it is desirable for the characteristic plantings to continue prominently on each side of the turn, to help identify the road.

In a relatively flat section, planting the tops of the rises with tall trees and the lower places with shrubs, with the intermediate plantings selected for their height, may add greatly to the attractiveness of the road and of the country through which it passes. The permission granted by some States to use public funds to plant trees upon private property adjoining the highway, with the consent of the property owner, makes possible some variations that might not otherwise be practicable. Such trees become public property and are in no way under the control of the landowner.

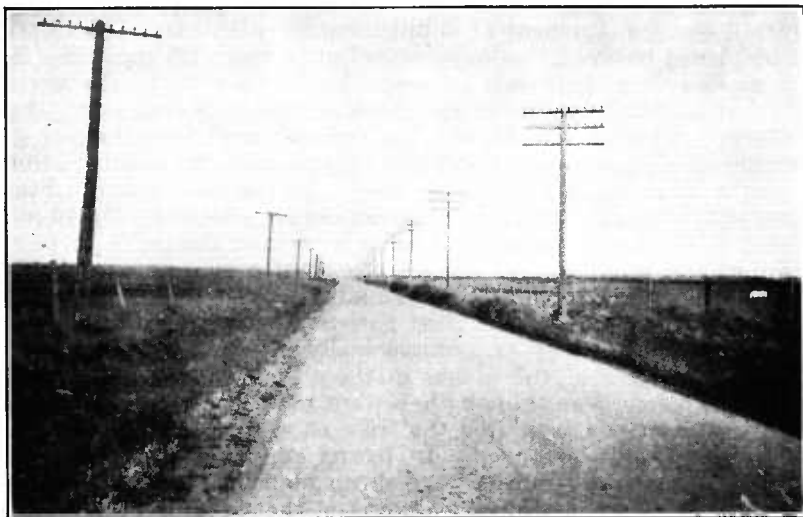


FIGURE 35.—A pole road. The use of native or other plants along this desolate right-of-way would transform it into a thing of beauty like the roads in figures 7, 34, and 36.



FIGURE 36.—Trees that serve as a windbreak as well as shade the road.

In many parts of the West, and especially on the Great Plains, where the roads are practically straight and almost flat (fig. 35) with few varieties of trees succeeding, possibly the formal design is preferable, relieved by underplanting with sufficient variety to avoid monotony (fig. 34). The planting of shade trees in much of this almost treeless country is needed as an economic as well as an esthetic

factor, and, if thoroughly and consistently done on each section line, would be a wonderful help in preventing some of the deleterious effects of drying winds that visit these regions. One of the most aristocratic suburbs of San Francisco has developed on land that was made attractive (fig. 36) by trees planted by a man still living. Cone-bearing and other evergreen trees are especially effective (fig. 37) when they thrive.

The advantages to be gained by planting trees along the roads in agricultural communities are sometimes offset by the encroachment of the roots and by the shade of trees on adjoining farm land; but, if the



FIGURE 37.—An evergreen windbreak of Monterey cypress along a highway.

right-of-way is reasonably wide, the least injurious trees selected, and care used in their placing, these objections can be largely overcome. Even if land for the purpose is taken from crops, the benefits accruing from such planting often more than compensate for the loss.

KINDS OF PLANTS TO USE

Native plants or those tried and known to succeed in the neighborhood rather than many introduced species should be selected, since they are more likely to maintain the healthy appearance essential to a pleasing effect, although any kinds that have been well tested and produce the same general effect in the landscape may be used advantageously. Some of the trees suitable for the different parts of the country are discussed in Farmers' Bulletin 1482, *Trees for Roadside Planting*.

Well-grown nursery plants are better than those collected, because their frequent transplantings produce a mass of fibrous roots near the trunk that enable the plant to take a new hold on the ground and become reestablished quickly. A plant growing in the wild that

has never been root-pruned has a few roots that run relatively long distances, most of which are lost when it is dug, because they are so tangled with other roots that even with the greatest care it is usually impracticable to get a large number of them. If, however, one wishes to take the chance of having to replace one-half to three-fourths of the plants transplanted, those which are collected may be used. It is usually more satisfactory to transplant these to a nursery row and cultivate them for 2 years before placing them in their permanent locations.

Plants of any size may be set, from seedlings 1 foot high to trees 6 inches or more in diameter. The most practical-sized shrubs to use are those 3 to 4 feet high; trees should be 1 to 2 inches in trunk diameter or 6 to 12 feet high. These are large enough to be more readily protected than smaller plants and soon attain a size that does not require much special attention; yet they are small enough to be easily handled and readily planted by one or two men at a minimum cost. Furthermore, it is easy to procure and protect the whole of the root system of such a plant if well-grown in the nursery and thus to move it with the least possible chance of checking its growth.

PLANTING THE TREES AND SHRUBS

Although community planning for roadside trees is desirable, the actual planting will doubtless have to be done by the individual landowner for many years, except along some of the leading highways in the more advanced States or where communities join in planting memorials.

Where it is impossible to secure sufficient community interest to work out a plan for a long section of road, the individual property owner should not hesitate to do his utmost on that portion which is adjacent to his property. It is only by the example of many individuals doing their part in widely separated localities that public interest sufficient to accomplish such work in a community can be created.

Some of the States recognize this fact and have laws to remit a part of the road tax for a limited number of years for trees planted and growing, provided they are not too close together. One of the North Atlantic States specifies that elms so freed from tax shall not be closer than 75 feet and other trees 50 feet. One of the Lake States places the distance for ornamental, nut, and fruit trees from 20 to 40 feet apart, while a New England State demands a distance of 40 to 60 feet.

If the plants are obtained from a nursery they should be unpacked as soon as received and the roots covered with moist soil at once. If they appear dry, it is well to soak them in water or wet them thoroughly with diluted clay mud before covering them or "healing in." After the holes are dug and ready, the plants to be transplanted should be taken from the healing-in ground with the roots covered with wet straw, moss, or burlap and planted immediately, to avoid the chance of the roots drying out.

The month or 6 weeks preceding freezing weather is the best time for transplanting deciduous plants in most of the eastern part of the United States and limited areas on the Pacific coast, as shown by the white portion of the accompanying map (fig. 38). The other desirable time for planting is in the spring after freezing weather is over, as soon as the ground is dry enough for the mechanical opera-

tion without puddling the soil. The planting should be done as early as possible, as the more opportunity for root growth there is before warm weather forces the top the better the results are likely to be.

Spring transplanting is usually best in those parts of the country where the ground freezes to a considerable depth, where there are dry winter winds, or where there is a deficiency of moisture in the autumn, as shown by heavy stippling on the map.

In the almost-frost-free areas, shown by light stippling, transplanting may be done whenever moisture conditions are satisfactory. Under the same conditions plants taken from pots or tubs may be set out, provided the ground is reasonably warm, so that root growth will proceed promptly from the ball to the surrounding soil.

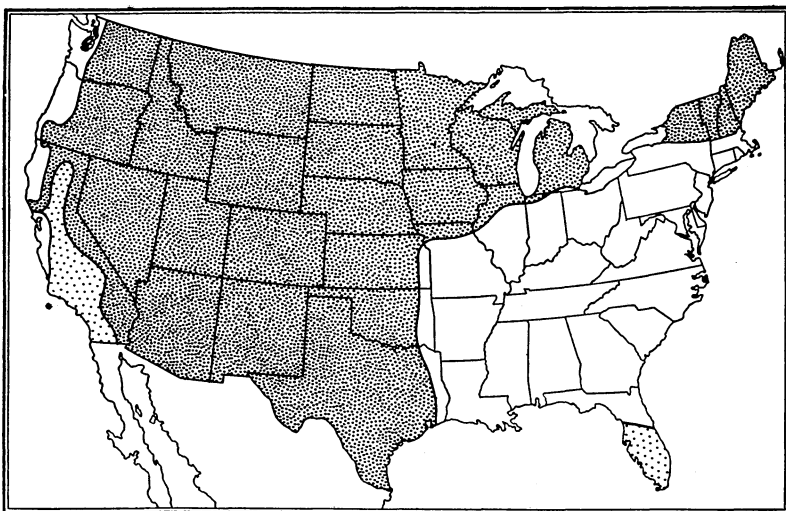


FIGURE 38.—The white areas show where fall is at least as favorable a time as spring for transplanting most woody plants. In the darkly stippled areas transplanting should be done only in the spring unless special care is exercised. In the lightly stippled areas transplanting may be done whenever moisture conditions are favorable.

Evergreens are moved at least 6 weeks earlier in the fall than deciduous trees and as much later in the spring.

In regions normally adapted to fall planting, newly set woody plants may be killed by a dry autumn followed by a dry winter with high winds or by a cold winter with so little snow that the ground freezes below the roots. On the other hand, woody plants may often be successfully planted in the fall, where such practice is not usually successful, by thoroughly mulching the soil if freezing is the sole cause of the difficulty, or by drenching the soil thoroughly and then mulching well if lack of moisture and high winds cause trouble. It is also desirable to protect the trunk and large limbs from wind by wrapping them with burlap or some other material.

The holes should be so much larger than the spread of the roots that the plant can be set out without doubling any of them, with at least a 3-inch clearance beyond their ends. If it is necessary to dig into the subsoil to set a plant at the same depth that it grew before, the subsoil dug out should be disposed of, and topsoil should be brought to replace it. If the subsoil is impervious, provision for drainage may be necessary, so that the hole will not act as a cistern, thus drowning

the roots. Rich topsoil should be used about the roots, or if the soil is not rich, well-rotted manure should be used with it. Artificial manures may also be used in moderation, but they are not a substitute for

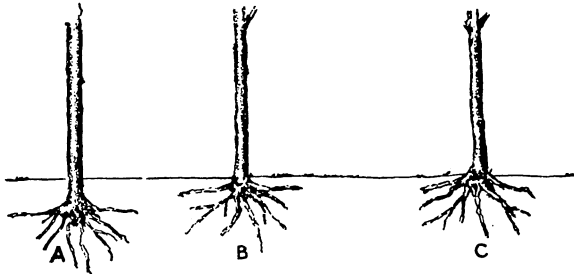


FIGURE 39.—Depth of planting: A, Too deep; B, proper depth; C, too shallow.

a rich soil or rotted manure. Perhaps the most satisfactory of the commercial fertilizers are ground bone, dried blood, fish scraps, and cottonseed meal.

Most woody plants should be set not more than 1 or 2 inches deeper

than they grew in the nursery; a few, like certain nuts, should be planted at the same depth (fig. 39). The soil should be worked in well around the roots, and the ground should be well firmed. Evergreen plants must be moved with a ball of earth if the transplanting is to be successful. In the western half of the United States special care must be given to newly set plants to have the ground well mulched the first year or two, and in many places it must be drenched also before the advent of winter.

PRUNING THE PLANTS

At transplanting, all plants moved without a good ball of earth must be well pruned. Collected trees and shrubs must have at least

three-fourths and often as much as nine-tenths of the top removed; nursery-grown trees should have at least half of the previous year's growth cut off. When possible, this should be done by removing whole limbs rather than by cutting back the ends of branches (fig. 40), although a little of the latter may also be necessary to preserve the natural form of the tree. It is usually desirable to stake trees of the sizes suitable for roadside planting, to prevent winds from working them loose in the soil and in many places to protect them from injury by livestock that may pass along the highway or even from cattle and hogs that in some States pasture at large.

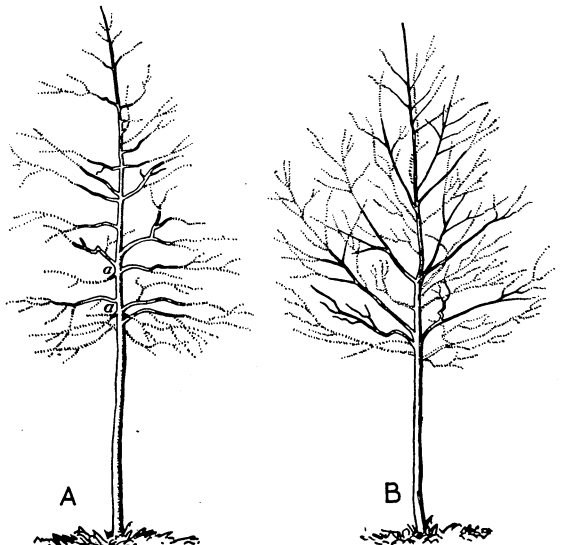


FIGURE 40.—Pruning newly planted trees: A, A pin oak well trimmed except for two bad stubs on the left of the trunk (aa); B, a well-pruned sycamore. Note how the general outline of the original trees is left when the pruning is completed. Dotted lines indicate branches that were removed in pruning.

Shrubs are usually pruned by removing weak branches, or occasionally by cutting ends from some of the shoots, but this latter method should be avoided whenever possible, as it is likely to destroy the natural form of the bush.

GUARDS

After planting, the tree should be protected from possible injury by a guard. Along much-traveled roads it is desirable to have some one of the more substantial forms used on city streets, but ordinarily on roads where livestock is occasionally driven a good guard consists of three strong stakes driven into the ground, held in place at the top by three cleats. The tree is supported by loops made from old garden hose, leather, or rope sufficiently tight to prevent it from swaying or chafing against the guard, while allowing it slight movement (fig. 41). Where stock is permitted to roam at large it may be necessary to protect shrubs by wire for a few years until they become established.

LATER CARE

CULTURE

For the first 3 years at least, either by cultivation or mulching, an area 4 feet in diameter for trees and one equal to the spread of branches for shrubs should be kept free from the competition of grass or weed roots. In the dry sections of the country, including all the region west of the ninety-fifth meridian and some east of it, water should be given during this period in order to get the plants established; if suitable varieties have been selected, further watering should not be needed. To stimulate rapid growth, annual applications of manure should be applied either as a mulch and later worked into the soil or incorporated with it immediately.

As all fertile land will support growth of some sort in addition to the trees, the original plan should determine the type to be encouraged. Usually this is either a vigorous shrub growth shading the ground and keeping noxious weeds in check or a turf where the weeds are kept down by mowing at such intervals as its character and vigor of growth require, usually three or four times a year. Along roads through woodlands nature will often appropriately reclothe the roadsides without aid, but on roadsides bordering on cultivated land effort is generally required to get the ground suitably covered to keep out objectionable plants and thus prevent the roadsides from becoming a propagating ground for weeds that might be troublesome on the adjoining cultivated land.

When the roadside is kept in turf, tree guards are needed much longer than where shrubbery is used, because when mowing is done

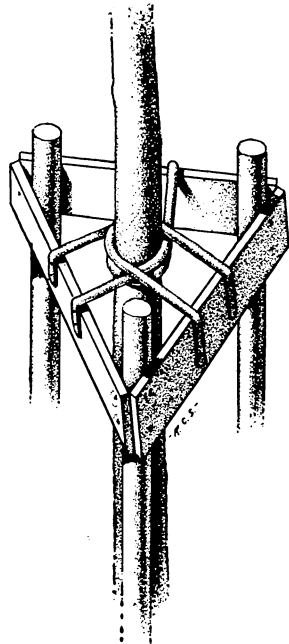


FIGURE 41.—A tree guard adequately supporting a tree.

there is always danger of injury to the trunks of even large trees. Where trees are surrounded by shrubbery clumps, there is seldom need of guards after the first 2 years, as they are then so firmly established that the danger of injury by the wind is practically eliminated.

When shrubbery is included in roadside planting, it should be kept free from weeds the first 2 years. To do this requires two or three hoeings the first year and the pulling or hoeing of a few of the more vigorous and persistent growths the second year, when the shrubs should be so well established as to shade out the most objectionable weeds.

Where shrubs are freely used, tree growth is usually more satisfactory without special attention than when the ground is covered by turf. After the roadside plantings have been established, the turf sections must be mowed at least once a year in the North and three or four times a year in the South, while the shrub sections need to be watched to see that weeds which are objectionable in open fields do not become established. Occasionally some of the shrubs nearest the road may have to be dug out, if there is a tendency to encroach upon the roadway. The same attention should be given to unplanted roadsides in the same localities.

PRUNING

After the trees are set, little pruning should be necessary. Dead limbs should be removed as soon as possible, and as the trees grow it may be necessary to remove the lower limbs in order to give the trees sufficiently high heads to avoid interference with traffic. Such pruning is usually deferred as long as possible without encroaching on the roadway, to encourage a strong root and trunk growth before the top is pushed into the air. Occasionally, too, a tree will grow more vigorously on one side than on the other; then it is frequently advisable to prune away part of the more vigorous side to make the tree symmetrical. Shrubs seldom require pruning beyond the removal of the deadwood.

Branches that grow toward the center of the plant instead of away from it, across other branches, or so near as to cause a rubbing as the plant develops should be removed as soon as they are discovered. No other pruning should be done, since it almost invariably gives the tree a mutilated appearance. Deciduous roadside trees and shrubs should not be "headed in" or "headed back", as the resultant growth makes them look brushy and unattractive during at least part of the year.

The control of pruning by public-service corporations is most difficult in those States that do not provide adequate supervision of such work. The compromise between the needs of the wire lines and the public interest and right in trees can be adjusted only by reasonable, farseeing, and well-trained officials who represent the public. Although much wanton destruction has been committed in the name of necessary pruning by untrained employees (fig. 42), relegating these lines to private property will not solve the difficulty. Recently, in locating a line on private property paralleling a main highway, a dozen magnificent oaks at a point where they added greatly to the landscape were cut down. On the other hand, the public has often been unnecessarily harsh, unsympathetic, and sometimes irritating in its attitude toward the needs of wire companies. Where a constructive policy administered by some agency that gives reasonable assurance

of continuity is formulated, wire companies usually show a cooperative spirit and in many cases employ experts in tree handling to supervise the necessary pruning.

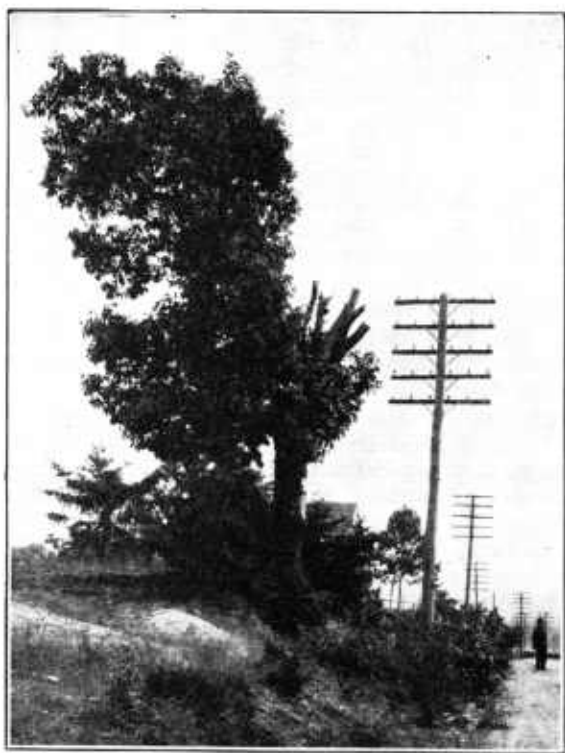


FIGURE 42.—A tree mutilated by linemen.

It is unfair to both individual property owners and wire companies to make the relationship a personal one. It is unreasonable to make each property owner a watchdog to prevent mutilation of his trees by ruthless or indifferent companies, and likewise it is unjust to expect conscientious companies to deal independently with every tree owner along the way, for their number is legion and their personalities multifarious, while the public interest in both the wire service and the trees is not represented. Fortunately, the method of putting wires underground is tending to lessen such interference with good roadside trees.

SPRAYING

On country roads, where growing conditions are better than in cities and where a more abundant bird life is likely to reduce the severity of insect attacks, spraying trees may be less essential to success than in many towns and cities. If it were a necessity, many communities that should beautify their roadsides would be deterred from undertaking it.

Then again, there are other communities that recognize handsome roadside trees as an asset and spray frequently in order to save them

from destructive attacks of insects or diseases. Unfortunately, no community can be certain that it will not have to take such a course or lose the trees.

Care of the trees, including spraying when necessary, would be more efficiently handled if supervised by a single administrative body, because it is more likely to be done economically and at the proper time. Some attacks on trees, as, for example, the work of some bark borers, are so insidious that the average person does not realize the approach of trouble until a cure is impossible. In addition to troubles common to all trees, each species is liable to those of its own; hence, the desirability of competent supervision by trained men with efficient outfits rather than leaving the work to individual initiative.

Because of the height which many trees attain, a powerful outfit capable of maintaining a pressure of 200 pounds per square inch is required to spray them carefully, the type for tall trees differing from that used on fruit trees and other low plants. For the latter, a mist within a few feet of the nozzle applied near the foliage to be treated is the ideal spray; for tall trees it is desirable that the liquid should leave the nozzle in a solid stream, breaking into spray as it passes through the air, the material being projected with sufficient force to reach the highest trees before being entirely converted into mist. Although a spray cannot be applied as uniformly as a mist, it is impracticable to extend the nozzles into the trees to reach the farthest portions, as is sometimes done with fruit and a few other low trees, or to climb into the tops of shade trees to cover every part. On the other hand, the mist spray is better for small trees, as much injury may be done to low trees or to the lower branches of high trees by the force of the stream from high-pressure outfits. In practice, it is estimated that up to 95 percent of the attacking insects can be killed with insecticides carefully applied by the stream method under high pressure.

In addition to the mechanical difficulty of satisfactorily covering high trees with insecticides or fungicides, there is the problem of selecting materials that will be effective against the insects and diseases and yet not discolor paint or stone when used near buildings. Whitewashing the trunks of trees is an unsightly practice which seldom prevents the attacks of insects. It makes the trunks of the trees obtrusive, when they should be inconspicuous, except occasionally as a warning to careless drivers.

Occasionally banding with cotton or proprietary preparations may be useful; but, because some of the preparations injure the trunks by constricting them, it should not be resorted to except upon special recommendation of an entomologist familiar with existing conditions.

MEMORIAL TREES

Roadside trees are now frequently planted as memorials. Where conditions are suitable, such plantings admirably fill the requirements of a memorial. One of the most impressive of these memorials was planted on the campus of a university by a young graduate before he had earned sufficient funds to express his appreciation for his Alma Mater in the form of a large gift. It consisted of a double row of elms, which have since become a magnificent avenue. Such memorials planted now may become as impressive, if the work is as well done. But all roads do not lend themselves to the formal arrangement

usually desired by those promoting memorial planting. To be effective the road should be straight, reasonably level, and wide, and only healthy and long-lived trees, preferably those attaining large size, should be used.

Such plantings should not be made unless there is some permanent organization or official with sufficient available funds to cultivate and tend the trees adequately, as well as to make necessary replacements for a period of at least 3 years. For every dollar spent for trees, guards, preparation of holes, and planting, there should be another reserved for the necessary later work. For every dollar spent for a good oak or similar tree 8 feet high, there should be at least \$2 available for planting and later care; and, if smaller trees or cheaper kinds are purchased, a larger proportion will be needed.

Often the last penny is expended in the planting, and no provision is made for the care of the trees until they attain sufficient size to be largely able to survive on their own account. The promoters regard the work as finished, but the trees are choked out by weeds or die from neglect, while those that survive are not thrifty, and the whole becomes a disgrace to the community instead of an honor to those it was intended to commemorate.

Although in the past loose methods have often been used because of lack of appreciation of the necessary details for success, yet on the whole such planting has undoubtedly been productive of good. The solicitation of funds has attracted attention to the proposed improvement, and the formal exercises at planting time have further brought it before the community. If the transplanting is well done, so that the trees become a living witness of the effort, interest will be so crystallized that it may be possible to bring about further plantings with less effort.

In successful planting, the holes are dug and filled with good soil, properly enriched, some time before the trees are expected to arrive. Posts for the guards are ready to be placed as fast as the trees are set, and an intelligent planter is employed to set the trees as soon as they are received. No speeches or other ceremonies are permitted to delay the actual planting after the trees are on the ground, as the good of the trees and not the glorification of the community should be the first consideration. Whether the ceremonies precede or follow the main planting, one tree must be used as symbolical of all. At the conclusion of the exercises it would be well to replace this tree by another planted in the regular way.

When appreciation of roadside plantings becomes more general, undoubtedly individuals and communities will add really decorative informal plantings to formally planted memorials and thereby add much beauty to their community.

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